
150
all new
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soups

7 Materials & Furnishings Palette

The materials and furnishings utilized within a streetscape contribute to a street's overall achievement of Great Streets goals: to be vibrant, walkable, sustainable, and durable. This palette identifies recommended and alternative elements which will further these goals and allow for their flexible application based on individual project budgets, priorities, and constraints.

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Materials for Pedestrian & Roadway Zones

This section provides information about the recommended and alternative materials to be utilized within the Roadway and Pedestrian Zones.

Roadway Zone Material

BITUMINOUS (ASPHALT) PAVEMENT

This section includes standards for all temporary and permanent installations of bituminous bases and surfaces for roadway, driveways and parking areas.

Bituminous material shall not be applied between November 1 and May 1. The courses shall not be placed when the air temperature at the paving site in the shade and away from artificial heat is below 40°F. Placing shall not begin until the air temperature is at least 40°F and rising. The Cown Engineer may authorize in writing construction of bituminous concrete pavements at lower atmospheric temperatures than those specified or may extend the dates of the paving season. No pavement shall be laid in the rain and the underlying course shall be dry during paving operations.

Each load shall be covered with canvas or other suitable material of ample size to protect it from the weather. Deliveries shall be made so that spreading and rolling of all mixture prepared for a day's run can be completed during daylight, or at night if the weather is acceptable. The mixture shall be delivered to the area to be paved in such a manner that the temperature at the time of dumping into the spreader will not be less than that specified. The range of acceptable temperatures of mixture delivered to the spreader shall be not less than 225°F nor more than 325°F. Material not within this temperature range shall be rejected. Hauling over freshly laid material will not be permitted.

Materials

- Aggregate for base and surface courses shall consist of clean, hard, durable particles of crushed stone, gravel, sand and fine mineral particles conforming to "VTRANS" Spec. Section 704.
- The aggregates for bituminous concrete pavement shall be crushed stone, crushed gravel and/or sand uniformly graded per ASTM D692-69, ASTM D1073-69, ASTM D242-64.
- Asphalt cement for use in the construction of bituminous concrete pavements shall be prepared by refining crude petroleum by suitable methods and shall conform to Standard Specification for Asphalt Cement for Use in Pavement Construction, ASTM D946-69. The grade of asphalt shall be AC5, AC10, or AC20 as directed by the Design/ Project Engineer.
- Emulsified asphalt shall conform to Standard Specifications for Emulsified Asphalt, ASTM D977-69.
- All bituminous Concrete shall be prepared in accordance with standard specifications for Hot-Mixed, Hot-Laid Asphalt Paving Mixtures ASTM D2629-60 which have been prepared in a plant which conforms to ASTM D995-67.

Materials shall be combined and graded to the composition limits by weight set in Section 406 of the State of Vermont Department of Highway Standards Specifications.

Before any base course material is laid, the subgrade shall be prepared in a proper manner. In all cases the top 6 inch layer of subgrade material shall be compacted in such a manner as to secure not less than 95% of the maximum density as determined by ASTM D1557/AASHTO T180 Method A (Modified Proctor) test.

All materials used for the construction of the subgrade, base and surface shall be unfrozen and free from organic or other deleterious matter. No subgrade, base or surface construction shall take place at temperatures below 40°F.

Mineral aggregate base and surface courses shall be placed in layers not to exceed 8 inches loose depth and 6 inches compacted depth.

After each layer is placed it shall be compacted with an approved roller weighing not less than 8 tons, or a rubber tired roller approved by the Engineer. Rolling of each layer shall be continued until a firm, solid and unyielding base is established before the next layer is begun. During compaction, the surface shall be of uniform texture and graded to obtain a true even surface.

Prior to laying the surface course, the underlying course shall be cleaned of all foreign or unsuitable material.

If the bottom course of bituminous concrete pavement is left over 30 days, the existing surface shall be cleaned.

All longitudinal and transverse joints and all cracks shall be sealed by the application of an approved joint sealing compound before spreading the finish coat. Any large cracks in a bituminous surface shall be thoroughly cleaned and filled

with a bituminous material or mixture approved by the City Engineer. Emulsified asphalt shall then be applied to the existing pavement in a manner approved by the Town Engineer. Contact surfaces such as curbing, gutters and manholes shall be painted with a thin, uniform coat of Emulsified Asphalt, immediately before the bituminous concrete mixture is placed against them.

Compaction shall be done by three wheel rollers or tandem rollers having a gross weight of not less than 8 tons and capable of providing a minimum compactive effect of 250 pounds per inch of width of drive roller. The rollers shall also be equipped with tanks and sprinkler bars for wetting the rollers.

Joints between old and new pavements or between successive day's work shall be made so as to insure a thorough and continuous bond between the old and the new pavement. Whenever the spreading process is interrupted long enough for the mixture to attain its initial stability, the paver shall be removed and a joint constructed.

Butt joints shall be formed by rutting the pavement in a vertical plane at right angles to the centerline. The butt joint shall be thoroughly coated with Emulsified Asphalt just prior to depositing the paving mixture.

Longitudinal joints that have become cold shall be coated with Emulsified Asphalt before the adjacent mat is placed. If they have been exposed to traffic, they shall be cut back to a clean vertical edge prior to painting with the emulsion.

Additional Resources

VTrans Standard D-11 Steel Grate; Cast Iron Grate Type A; Cast Iron Cover in *Appendix section A-1*

VTrans Standard D-15 Precast Reinforced Concrete Catch Basin w/ Cast Iron Grate; Precast Reinforced Concrete Manhole w/ Cast Iron Cover; Cast Iron Grate w/ Frame, Type D; Cast Iron Grate w/ Frame, Type E in *Appendix section A-1*

Information on colored asphalt can be found under *"Colored Asphalt" on page 169* in the *"Bikeways"* section.

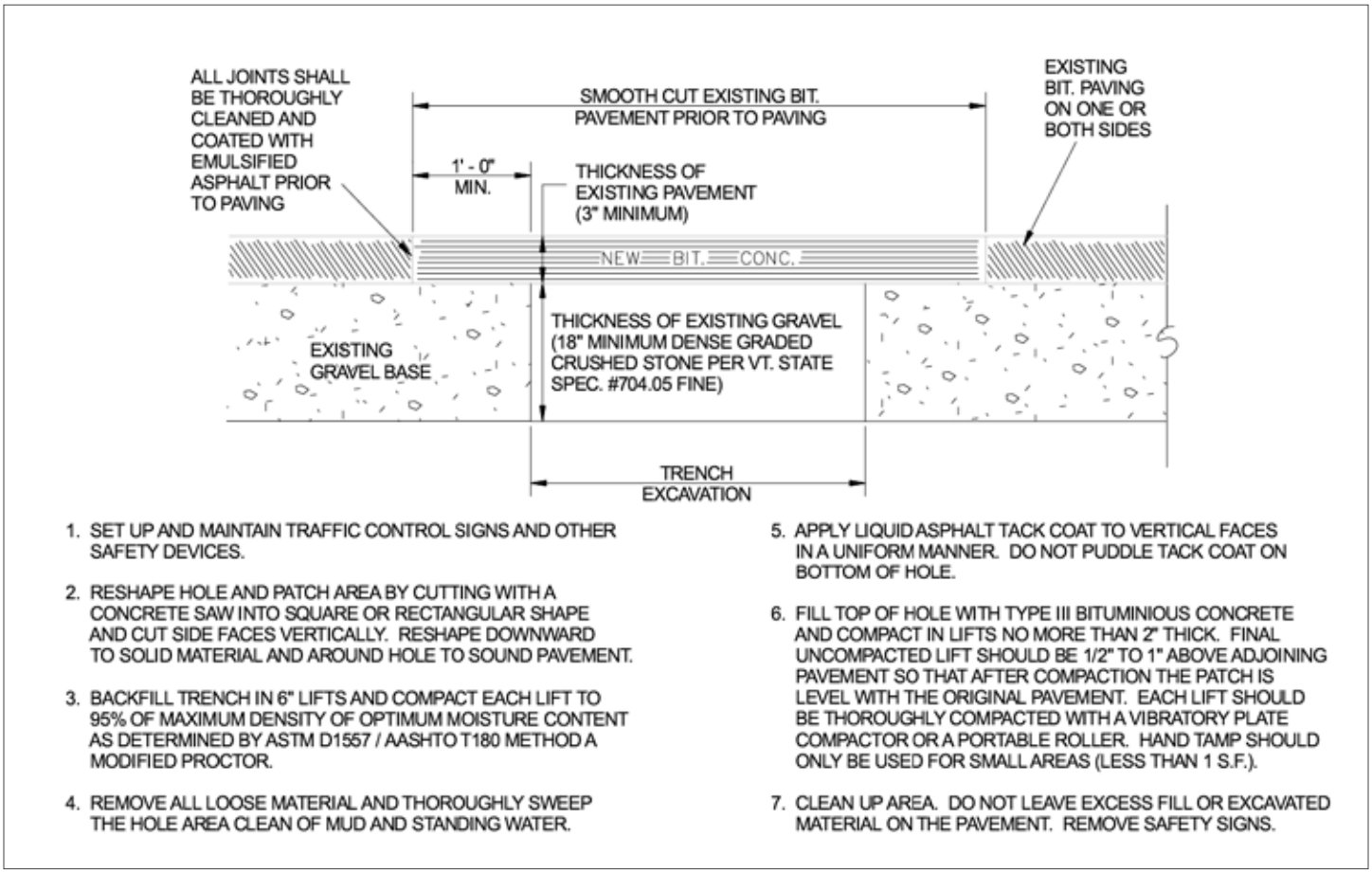


Figure 11: *Replacement of Bituminous Pavement*

Painted Pavement Markings

Markings shall be in accordance with 646.06 of the Vermont Standard Specifications.

All lines shall be clear and distinct with sharply defined edges. Paint shall be applied at the rate of 70.0–73.15 square feet per gallon with glass beads applied at a rate of 8 pounds per gallon of paint for painted pavement markings.

Reflectorized paint pavement markings shall be applied by a method in which the liquid paint is applied to the road surface and the glass beads are immediately applied on the paint and firmly embedded therein, and which shall provide a retroreflective marking, with a night visibility satisfactory to the Municipality. The material shall have a minimum wet film thickness of 22 ± 1 mil for paint, unless otherwise specified, and shall be applied in a smooth uniform coat, free from thin places or films of excessive thickness.

Paint lines immediately after all aspects of the paving operations have been completed and before dirt or moisture can accumulate on pavement surfaces.

Carefully layout and define all painted lines on the surface of the pavement, by means of chalk markings, before painting, and accurately paint all lines within the limits and to the dimensions indicated on approved drawings. All surfaces must be thoroughly cleaned before lines are painted.

Reference
Ref. dwgs. **VTrans Standard E-191; E-192; E-193 Pavement Marking Details** in *Appendix section A-1.*

Parking Lane

ALTERNATE OPTION (PILOT)

Permeable Pavers

Dimensions	Parking lane: 8' W typical 6" concrete band on travel lane side
Material	Clay brick permeable paver 4" x 8" x 2 ¾"
Manufacturer	Whitaker Greer, Belden, Pine Hall
Note	Permeable pavers in parking lane should be pilot first.

Curbs

RECOMMENDED OPTION

Granite Curb

Dimensions	6" width
Material	Granite
Note	Segments of curb longer than 100' of replacement, or half a block of project, replace with granite. Minimum lengths of straight segments of sloped curb shall be two (2) feet. All other straight curb types shall have three (3) feet minimum lengths. Generally, curb segments on curves with radii of one hundred (100) feet or less shall be shaped to the required curvature and the ends cut on radial lines. Curves of over one hundred (100) feet radii shall use straight curb segments.
Reference	Ref. dwg. **VTrans Standard C-10 Curbing** in *Appendix section A-2* Ref. dwg. **VTrans Standard C-2BM** in *Appendix section A-2*

ALTERNATE OPTION

Cast in Place Concrete Curb

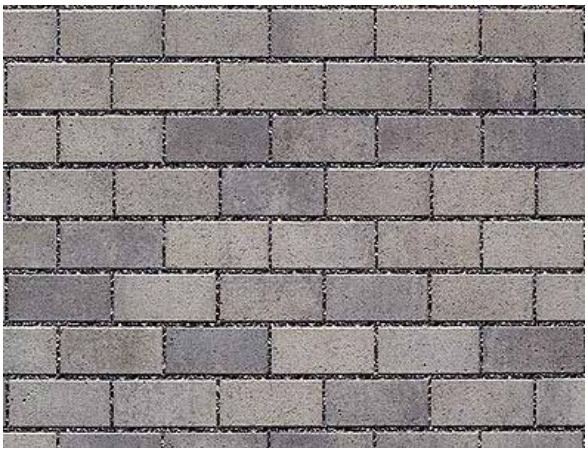
Dimensions	6" width
Material	Concrete
Note	Segments of curb that are less than 100' and are currently concrete, replace with concrete.
Reference	Ref. dwg. **VTrans Standard C-10 Curbing** in *Appendix section A-2*

	Least				Most
Aesthetics					●
Upfront Cost					●
Durable					●
Available				●	

	Least				Most
Aesthetics		●			
Upfront Cost		●			
Durable		●			
Available					●

Tree Belt Permeable Pavers

RECOMMENDED OPTION



4" x 8" Concrete Brick

Manufacturers	Techo Bloc, Unilock, E.P. Henry, Nicolock
Dimensions	4” x 8” x 3” (nominal) preferred, or similar
Material/Finish	Precast Concrete Brick, sealed Dense finishes only. Washed, Tumbled, or Brushed finishes **NOT** recommended.
Paver Style/Color	Techo Block—Victorien: Shale Grey Unilock—Eco-Priora: Winter Marvel
Pattern	Running Bond—Parallel to Street
Void Space	6–12%
Joint Width	.25”–.5”
Non-Permeable Opt.	Available
Performance	Paver & Base must support H-20 vehicular loading while allowing infiltration to soils below.
Installation	Install per manufacturer instructions to accommodate site-specific needs (utilities, Soil Cells, salt, etc.)
Note	Concrete pavers are less durable than clay pavers in high-salt environments. *Appendix section A-8*

Clear Sidewalk & Frontage Zones

Figure 12: *Concrete sidewalk with 3' x 4' running bond pattern with long side perpendicular to curb.*

Cement Concrete Sidewalk

This includes a sidewalk made of one course Portland cement concrete not less than five inches (5") thick and with a width of not less than five feet (5'). Where the sidewalk crosses a driveway, the depth of concrete shall not be less than five inches (5") for residential driveways and eight inches (8") for commercial and industrial driveways for the full width of the driveway.

All concrete used in the construction of cement concrete sidewalks shall be Air Entrained not less than five percent nor more than seven percent so determined by an air meter approved by the Engineer. This concrete shall have a 28-day compressive strength of 4,000 psi and shall meet Section 501 of the State of Vermont Standard Specifications for Construction for Class B concrete or as periodically amended.

Preparation of subgrade: All boulders, organic material, soft clay, spongy material, and any other unsuitable material shall be removed and replaced with approved material. The sub- grade shall be properly shaped, rolled, and uniformly compacted to conform with the accepted cross-sections and grades.

Base: A minimum base depth of six inches (6") of compacted crusher run gravel (704.05) or sand (704.03) shall be constructed on the subgrade to accepted cross-sections and grades.

Forms for concrete: The forms for the concrete shall be of wood or metal, well-oiled, straight, free from warps or kinks, and of sufficient strength. They shall be staked securely enough to resist the pressure of the concrete without spring. When ready for the concrete to be deposited, they shall not vary from the approved line and grade and shall be kept so until the concrete has set.

Placing and finishing concrete: Just prior to placing the concrete, the subgrade shall be moistened. After being mixed to the proper consistency, the concrete shall be placed in the forms and thoroughly tamped in place so that all honeycombs will be eliminated and sufficient mortar will be brought to the surface. After this, the surface shall be brought to a smooth, even finish by means of a float. The surface shall be broom finished. All faces adjacent to the forms shall be spaded so that after the forms are stripped the surface of the faces will be smooth, even, and free of honeycombs. All edges shall be tool-rounded with an edge having a quarter inch (¼") radius.

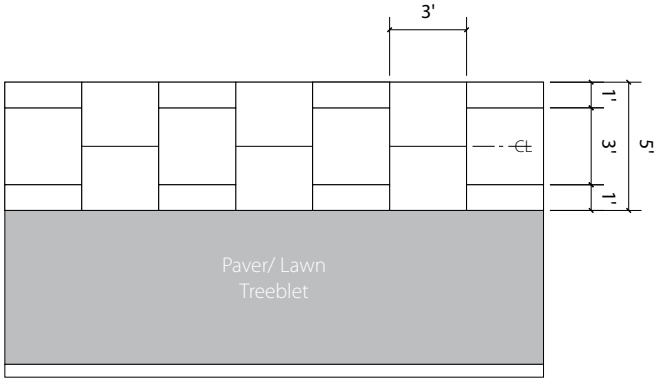
Expansion joints and scoring concrete: Half-inch (½") transverse expansion joints shall be placed at intervals not exceeding twenty feet (20'). Sidewalks shall be scored to a depth of one inch (1") every three feet (3'). Preferred scoring pattern to be "running bond" per *Figure 9*. Curb and sidewalk sections shall be separated by an expansion joint constructed of material conforming to AASHTO Designation M-135.

Curing the concrete: When completed, the concrete shall be kept moist for a period of not less than three days or longer if the Design/Project Engineer or Building Inspector deems necessary and shall be protected from the elements in an approved manner. The Contractor shall apply Lin-Seal White curing and anti-spalling compound to the concrete according to directions of the manufacturer.

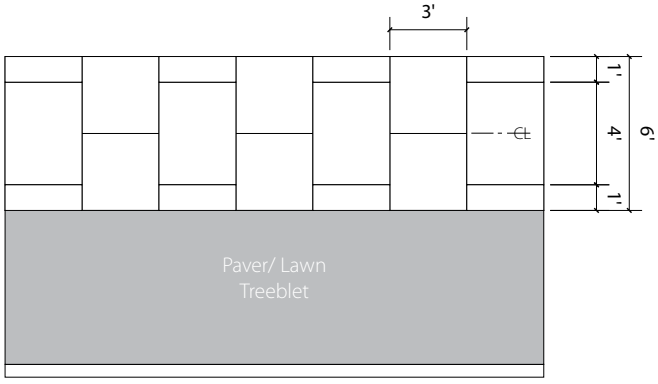
Backfilling: Backfill shall be of suitable bank run gravel and shall be placed and tamped until firm and solid. Backfilling shall follow immediately after the concrete forms have been removed.

Seasonal limits: No concrete shall be poured on a frozen or thawing subgrade during unseasonable weather conditions or when the temperature is 38°F and falling. The Contractor shall record the temperature daily as outlined in the Proposed Recommended Practice - Cold Weather Concreting, ACI 306. In hot weather, the temperature of freshly placed concrete shall not be allowed to exceed 85°F, conforming to ACI 305.

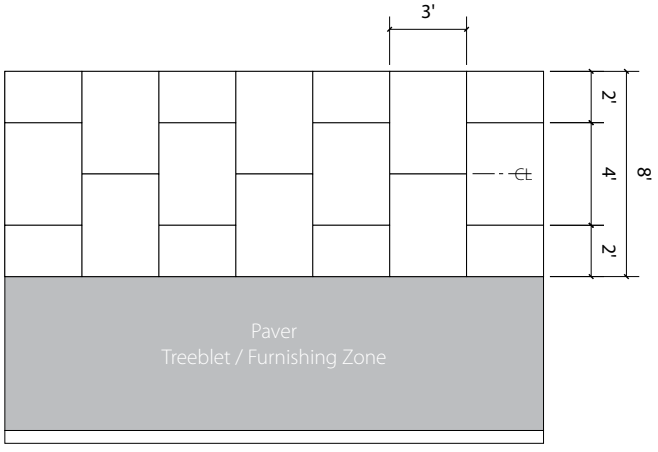
Sidewalk Scoring Pattern—Running Bond



Applied to 5' Minimum width
Clear Sidewalk Zone

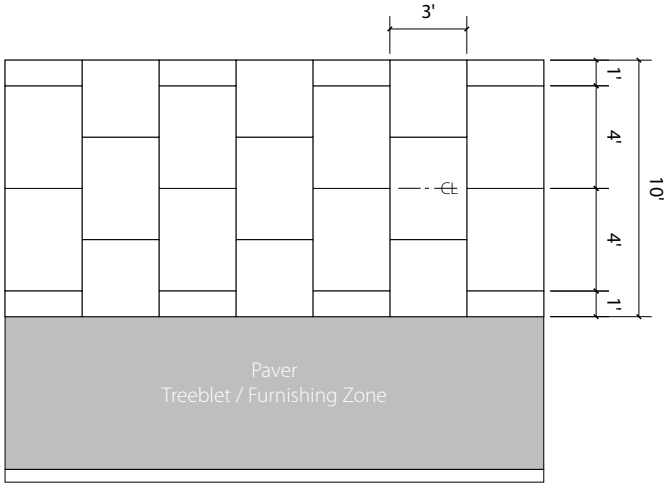


Applied to 6' Preferred width for
Clear Sidewalk Zone on Residential Street Types



Applied to 8' width combined
Clear Sidewalk Zone & Frontage Zone

**Where this dimension is greater than 8' but less than 10', the dimension of the outermost rectangles should be adjusted. The pattern should always begin with a 4' rectangle centered within the sidewalk width.*



Applied to 10' width combined
Clear Sidewalk Zone & Frontage Zone

**Where this dimension is greater than 10', the dimension of the outermost rectangles should be adjusted. The pattern should always begin with two 4' rectangles centered within the sidewalk width.*

Crosswalks

ARECOMMENDED OPTION

Conventional Continental Crosswalk

Dimensions	• 8' minimum width • 10'–12' feet preferred (Residential) • 14'–16' feet preferred (Commercial) • Extra width should be used for high pedestrian volumes or to increase visibility of crossing. Stop lines (when used): • 4' min. in advance of crosswalk • 12" wide
Pattern	• 12"–24" wide stripes • 12"–24" stripe spacing Longitudinal lines parallel to flow of traffic extending the full width of the roadway
Material	White retroreflective thermoplastic
Note	Preferred use is only on Residential Street Types, and at uncontrolled/unsignalized midblock crossings.
Reference	See *"Crosswalk" on page 108*

	Least				Most
Safety				●	
Functional			●		
Maintenance			●		
Available					●

ALTERNATE OPTION

Brick & Granite Crosswalk

Dimensions	• 8' minimum width • 14'–16' feet preferred (Commercial) • Extra width should be used for high pedestrian volumes or to increase visibility of crossing. Stop lines (when used): • 4' min. in advance of crosswalk • 12" wide
Pattern	• 8" × 4" brick pavers in herringbone pattern • 12" wide granite banding each side • 12" wide reflective banding each side Granite banding and transverse lines extend the full width of the roadway.
Material	Brick pavers, granite banding, and white retroreflective thermoplastic
Note	Preferred use is at all intersections in high pedestrian areas within the core of downtown.
Reference	See *"Crosswalk" on page 108*

	Least				Most
Safety					●
Functional				●	
Maintenance				●	
Available				●	

ALTERNATE OPTION

Enhanced Crosswalk (PILOT)

Enhanced crosswalks are preferred in high visibility concern areas of downtown. When using this type of treatment, consideration must be given to safe accommodation of people with disabilities. To accommodate these users, care should be taken to ensure that the material used in these crosswalks is firm, stable, slip resistant and visible. Textured pavements are generally preferable over actual decorative material such as bricks or pavers, however they can still present a bumpy surface. The use of colored and textured crosswalks alone without any additional pavement markings does not legally constitute a marked crosswalk. One of the MUTCD approved crosswalk patterns must be used to delineate the colored and/or textured area. However, the preferred marking is the MUTCD "standard" (two parallel transverse white lines) crosswalk marking that extend the full width of the roadway.

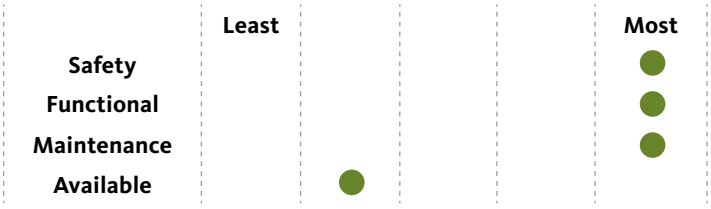
Dimensions	See recommended crosswalk
Pattern	TBD
Material	• Inlaid preformed thermoplastic crosswalk pattern. • Inlaid using infrared heating equipment. • ADA compliant - pedestrian and wheelchair friendly surface. • High skid/slip resistant for safety.
Reference	See *"Crosswalk" on page 108*

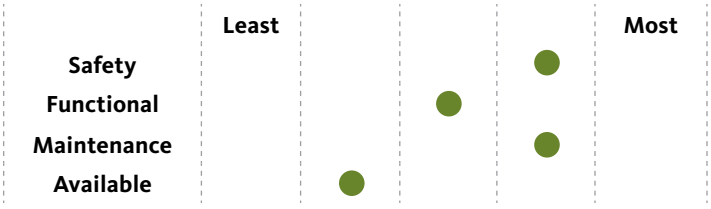
CUSTOM OPTION

Custom Designed Crosswalk (PILOT)

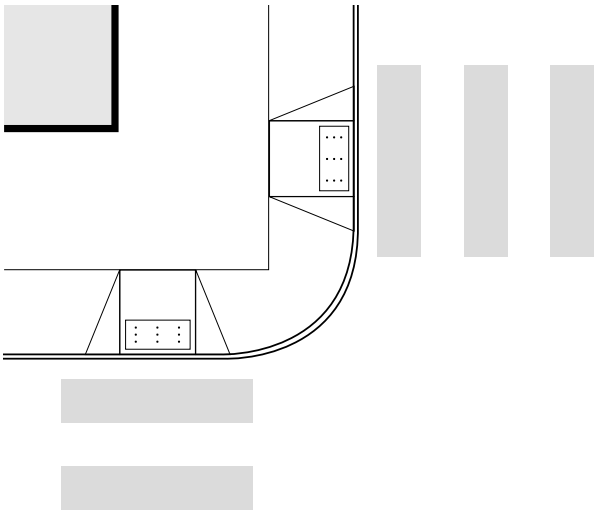
Occasionally, custom designed crosswalks are installed to increase visibility or to highlight and/or celebrate a piece of infrastructure or an issue in the community. Custom crosswalks are most often created through the use of paint, and typically last only a season. The use of colored and textured crosswalks alone without any additional pavement markings does not legally constitute a marked crosswalk. One of the MUTCD approved crosswalk patterns must be used to delineate the colored and/or textured area. However, the preferred marking is the MUTCD "standard" (two parallel transverse white lines) crosswalk marking that extend the full width of the roadway.

Dimensions	See recommended crosswalk
Pattern	TBD, Custom 12" wide reflective banding on each side
Material	• Traffic Paint • White retroreflective thermoplastic for transverse lines
Note	Requires review and approval by City Engineer
Reference	See *"Crosswalk" on page 108*





Curb Ramp



Flared

Description	Paired perpendicular curb ramps from level landing—side flares with detectable warning strip.
Conditions	Typical for downtown commercial streets where continuous circulation is desired. Pedestrians are able to approach the ramp from multiple directions.
Notes	Catch basins should be located uphill of a curb ramp in order to avoid puddling and freezing in the flattest part of the ramp.
Reference	*"Curb Ramp" on page 109* Ref. dwg. **VTrans Standard C-3A Sidewalk Ramps** in *Appendix section A-3*

Drive Entrances

Where sidewalks intersect driveways—both those that are constructed with with curb returns and those that are similar to curb ramps (i.e., without curb returns)—the sidewalk material should be carried across the driveway (see diagrams on following page). This design detail alerts drivers that pedestrians have the right of way and provides a more continuous pedestrian facility. Driveways and driveway aprons that are constructed like ramps, with steep, short side flares, can render a section of sidewalk impassable, especially when encountered in series, as in residential neighborhoods. Compound cross-slopes, such as those that occur at the flares of a driveway apron or curb ramp, may cause tipping and falling if one wheel of a chair loses contact with the ground or the tip of a walker or crutch cannot rest on a level area. A level area, or area with minimal cross-slope (2% or less) is necessary for accessible passage across a driveway.

To maintain an acceptable cross-slope and facilitate wheelchair movement at driveways, consider using one of the following techniques to prevent an exaggerated warp and cross-slope:

- Construct wide sidewalks to avoid excessively steep driveway slopes. The overall width must be sufficient to avoid an abrupt driveway slope.
- Incorporate buffer zones so the sidewalk can remain level, with the driveway grade change occurring in the buffer zone.
- Where constraints do not allow a buffer strip, wrapping the sidewalk around driveway entrances has a similar effect, although this method may have disadvantages for pedestrians with sight impairments who follow the curb line for guidance.
- When constraints allow for only minimal sidewalks behind the curb, dipping the entire sidewalk at approaches keeps the cross-slope at a constant grade. This may be uncomfortable for pedestrians and may create drainage problems behind the sidewalk.

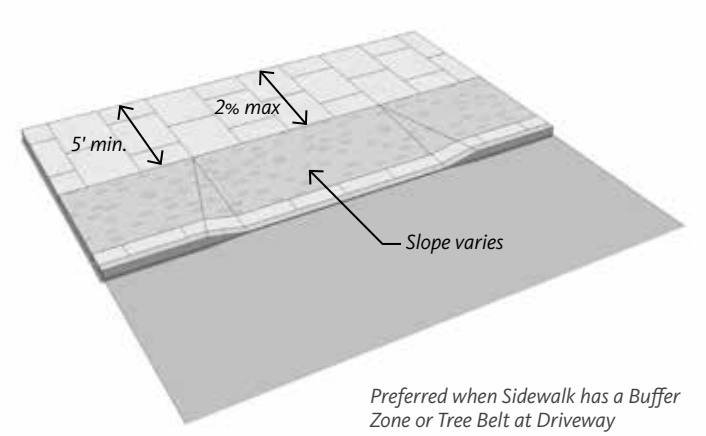
Ref. dwg. **VTrans Standard B-71 Standards for Residential and Commercial Drives** in *Appendix section A-2.*

Ref. dwg. **VTrans Standard C-2A Sidewalk Drive Entrance with Sidewalk Adjacent to Curb** in *Appendix section A-2.*

Ref. dwg. **VTrans Standard C-2B Sidewalk Drive Entrance with Sidewalk and Green Strip** in *Appendix section A-2.*

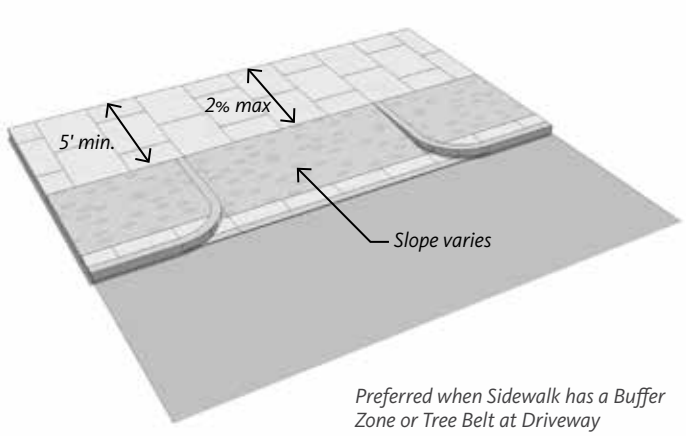
Ref. dwg. **VTrans Standard C-2BM Portland Cement Concrete Sidewalk Drive ENtrances with Vertical Granite Curb** in *Appendix section A-2*

Drive Entrance with Curb Ramp

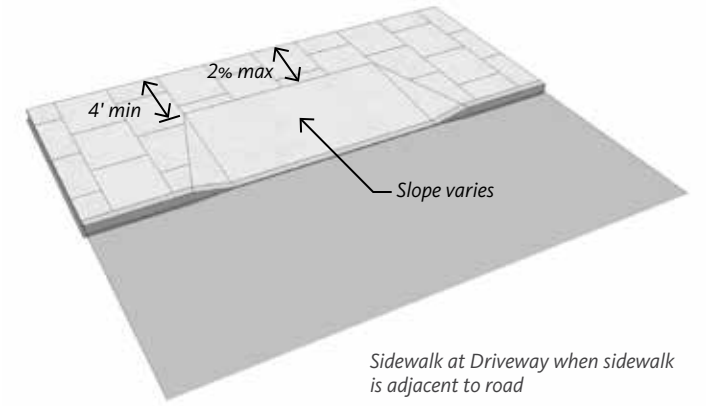


Preferred when Sidewalk has a Buffer Zone or Tree Belt at Driveway

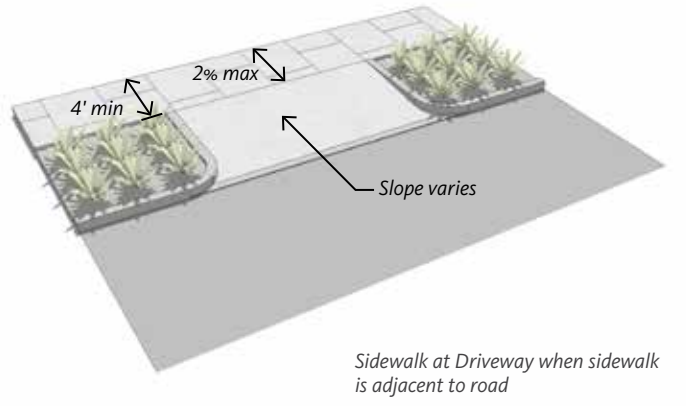
Drive Entrance with Curb Return



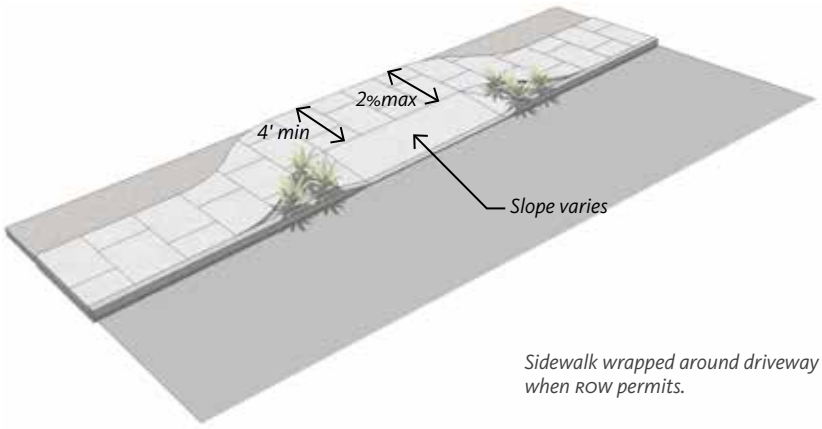
Preferred when Sidewalk has a Buffer Zone or Tree Belt at Driveway



Sidewalk at Driveway when sidewalk is adjacent to road



Sidewalk at Driveway when sidewalk is adjacent to road



Sidewalk wrapped around driveway when ROW permits.

Detectable Warnings/ Truncated Domes

A detectable warning is a unique and standardized surface by ADAAG (ADA for Accessible Design) intended to function much like a stop sign to alert pedestrians who are blind or visually impaired to the presence of hazards in the line of travel. Truncated domes are highly detectable by pedestrians with visual impairments so they can determine the end of the sidewalk and the beginning of the traveled way.

Shall be furnished and installed in conformance with ADA Accessibility Guidelines. Install detectable warnings:

- At the edge of depressed corners.
- At the border of raised crosswalks and raised intersections.
- At the base of curb ramps.
- At the border of medians and islands.

Detectable warning surfaces should extend a minimum of two feet (2') in the direction of travel. The surface should also extend across the full width of the curb ramp or flush surface. Detectable warning designs using truncated domes should comply with the following specifications.

Truncated domes must have a base diameter of 0.9 inches minimum to 1.4 inches maximum, a top diameter of 50% minimum to 65% maximum of the base diameter, a height of 0.2 inches, a center-to-center spacing of 1.6 inches minimum to 2.4 inches maximum measured along one side of a square arrangement and a base-to-base spacing of 0.65 inches minimum.

Align domes on a square grid in the predominant direction of travel to permit wheels to roll between the domes. Truncated dome surfaces should not be used for wayfinding or directional information.

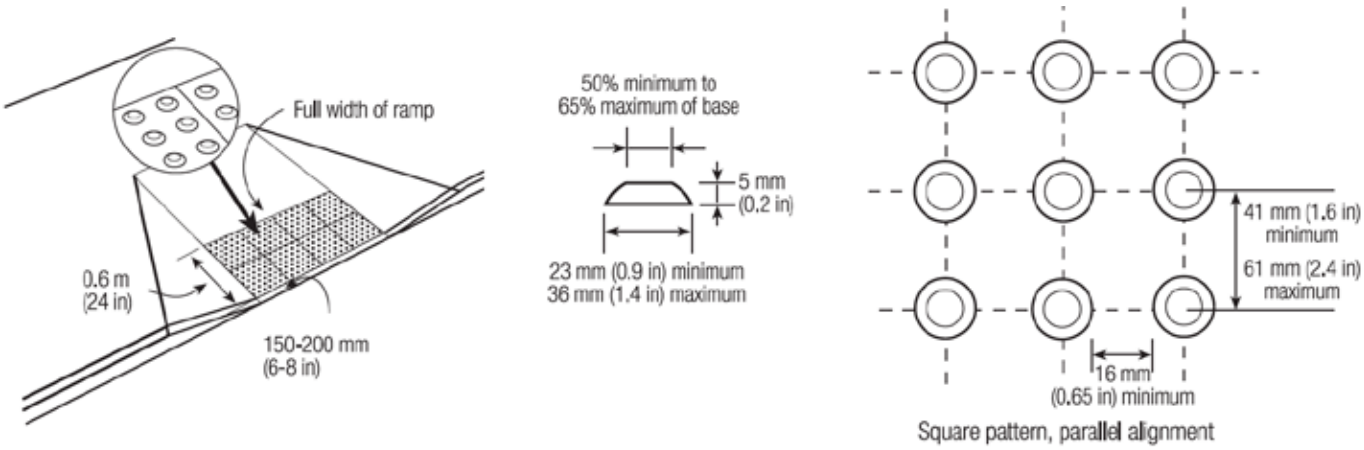
For pedestrians with low vision, there should be at least a 70% contrast in light reflectance between the detectable warning and an adjoining surface, or the detectable warning can be yellow. The material used to provide visual contrast is an integral part of the detectable warning surface and can be dark-on-light or light-on-dark.

Material

Cast iron, non-coated truncated domes/detectable warning plates.

Fabricators

The Detectable Warning Surface shall be supplied by East Jordan Iron Works, Inc., of East Jordan, MI, or Neenah Foundry, Neenah, Wisconsin, and installed in accordance with manufacturer requirements and recommendations for environmental conditions, surface preparation, installation and curing procedures, and materials compatibility.



Detectable warnings/truncated domes on curb ramps.

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Furnishings for Pedestrian Zones

This section provides a palette of recommended and alternative furnishings to be utilized within the Pedestrian Zone.

Selecting Street Furnishings

This palette of street furnishings has been selected due to their adherence to the Great Streets principles and design goals. In particular, this palette has been selected to complement Church Street's unique visual character and to ensure that streetscapes showcase the unique characteristics of the built environment on adjacent private property.

Street furnishings in this section include recommended and alternate options that ensure streetscapes are unified throughout the downtown through the application of a family of elements. This also provides for variability in individual streetscapes based on character, constraints, and project cost. Several of these furnishings include a rating system which is intended to assist in the selection of the most appropriate furnishing for a project's needs based on the following characteristics:

- **Aesthetics**: Visually appealing, complimentary of downtown character
- **Durability**: Long-lasting, able to withstand urban and winter conditions; low lifecycle cost relative to upfront cost
- **Functionality**: Able to be used in an intuitive and accessible manner
- **Safety:** Provides the greatest visibility or protection for users, particularly for pedestrians and bicyclists
- **Upfront Cost:** Expense to purchase or install
- **Maintenance:** Expense or labor required to maintain in proper, working condition
- **Availability:** Availability to and familiarity by local contractors/city departments; level of effort or cost associated with acquiring
- **Sustainability:** Recycled, sustainably harvested, other environmental verification

In general, preference should be given to using furnishings that have high durability and sustainability ratings. In particular, street furnishings should not utilize tropical hardwoods (i.e. Ipe) and efforts should be made to secure a locally sourced material if available. Because these furnishings may not be widely available, or may come with greater upfront costs or increased maintenance requirements, alternative options are provided. Additionally, some of these elements have been identified as a pilot, to be tested before being installed widely. This approach will allow the City to test the performance or location of the furnishing, and explore emerging materials or approaches.

Placement of Furnishings

Street furniture—such as benches, kiosks and bike racks—adds to the amenity and interest of the street, encourages social activity, and can help contribute to a distinctive identity for a neighborhood or district. Well designed street furniture makes the sidewalk more comfortable and life on the sidewalk more convenient. In addition to providing amenities, street furniture can also provide a buffer from the noise and commotion of vehicles on the street. Street furniture that is not thoughtfully laid out can obstruct and clutter the sidewalk environment. To create Great Streets, street furniture should be used to enhance mixed use areas, particularly on streets connecting Church Street to the waterfront, around City Hall Park, and other areas with high pedestrian activity, such as near higher volume transit stops.

This section provides design guidelines for street furniture to be located in the Pedestrian Zone. Burlington's street furniture must be organized in a way that maximizes safety, comfort, and function for all users. The design of street furniture should be simple and compatible with the existing built environment. When commissioned, unique and creative designs for street furniture should add to the character of the street and to Burlington's sense of place. However, these elements should adhere to the required basic characteristics, dimensions and performance criteria to ensure that they're durable, safely installed, and accessible to all users.

Street furniture should normally be installed in the Tree Belt/ Furnishing Zone, although it can also be installed in the Frontage Zone and on curb extensions. Street furniture should not be installed in or protrude into the Clear Sidewalk Zone.

For more specific details regarding the placement of these elements within the right-of-way, see *"Street & Intersection Assemblies" on page 80* and *"Element Siting & Considerations" on page 112*.

Benches

RECOMMENDED OPTION

Neoliviano—by Landscape Forms

Dimensions	26.5" W x 31" H 3 lengths available: 24", 69", 118"
Material	Aluminum frame & thermally modified ash seat and back
Finish	RAL 9007 Gray Aluminum powdercoat
Armrests	Intermediate armrest option available for 118" bench only
Installation	Mount with manufacturer-provided hardware. Install per manufacturer instructions. Mounting: surface or embedded
Manufacturer	Landscape Forms
Note	*Appendix section A-8*

	Least				Most
Aesthetics					●
Upfront Cost					●
Sustainability				●	
Availability					●

RECOMMENDED OPTION

Neoliviano Backless—by Landscape Forms

Dimensions	19.5" W x 17" H 2 lengths available: 5', 6'
Material	Aluminum frame & thermally modified ash seat
Finish	RAL 9007 Gray Aluminum powdercoat
Armrests	Intermediate armrest not available
Installation	Mount with manufacturer-provided hardware. Install per manufacturer instructions. Mounting: surface or embedded
Manufacturer	Landscape Forms
Note	*Appendix section A-8*

	Least				Most
Aesthetics					●
Upfront Cost					●
Sustainability				●	
Availability					●

ALTERNATE OPTION

Exposition Contour—by Anova

Dimensions	33″ H x 25″ W 3 lengths available: 4', 5', 6'
Material	Steel
Finish	RAL 9007 Gray Aluminum powder coat on Plastisol
Dividers	Intermediate skate-deterrent dividers are available with this bench. Install dividers on all benches
Installation	Mount with manufacturer-provided corrosion resistant hardware. Install per manufacturer instructions. Mounting: surface
Manufacturer	Anova
Note	*Appendix section A-8*

	Least				Most
Aesthetics			●		
Upfront Cost			●		
Sustainability			●		
Availability					●

ALTERNATE OPTION

Exposition Contour—by Anova

Dimensions	18”H x 21”W x 74”L 3 Lengths Available: 4’, 5’, 6’
Material	Steel
Finish	RAL 9007 Gray Aluminum powder coat on Plastisol
Dividers	Intermediate skate-deterrent dividers are available with this bench. Install dividers on all benches.
Installation	Mount with manufacturer-provided corrosion resistant hardware. Install per manufacturer instructions. Mounting: surface
Manufacturer	Anova
Note	*Appendix section A-8*

	Least				Most
Aesthetics			●		
Upfront Cost			●		
Sustainability			●		
Availability					●

ALTERNATE OPTION

Eva Bench-by Victor Stanley (Pilot)

Dimensions	30″ H x 25″ W 3 Lengths: 2', 4', 6'
Material	Recycled solid steel & Black Locust Board Seat and Back
Finish	Hot Dip Galvanized with RAL 9007 Gray Aluminum powdercoat
Dividers	Intermediate armrest option for 4' & 6'
Installation	Mount with manufacturer-provided hardware. Install per manufacturer instructions. Mounting: surface or embedded
Manufacturer	Victor Stanley
Note	Prototype available by manufacturer upon request for a more ecologically sensitive hardwood material. Should be field tested to determine durability. Bench frame should accomodate flat board (not rounded) in order to be replaced with an alternative wood material in the case of failure. *Appendix section A-8*

ALTERNATE OPTION

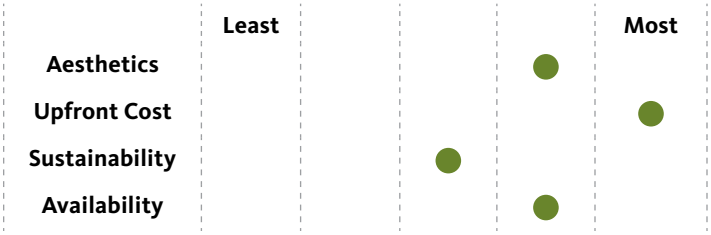
Eva Backless Bench-by Victor Stanley (Pilot)

Dimensions	23″ H x 18″ W 3 Lengths: 2', 4', 6'
Material	Recycled solid steel & Black Locust Board Seat
Finish	Hot Dip Galvanized with RAL 9007 Gray Aluminum powdercoat
Dividers	Intermediate armrest option for 4' & 6'
Installation	Mount with manufacturer-provided hardware. Install per manufacturer instructions. Mounting: surface or embedded
Manufacturer	Victor Stanley
Note	Prototype available by manufacturer upon request for a more ecologically sensitive hardwood material. Should be field tested to determine durability. Bench frame should accomodate flat board (not rounded) in order to be replaced with an alternative wood material in the case of failure. *Appendix section A-8*

ALTERNATE OPTION

Cubic Stone Bench

Dimensions	18–24”H x 24–48”W x 24–96” L
Material	Vermont-Quarried Cubic Granite or Marble
Finish	Sawn thermal-finish top, Split or Sawn thermal-finish sides. Seal per quarry instructions.
Installation	Set on reinforced concrete base to prevent frost-heaving.
Note	When utilized, material should be sourced from Vermont or the US



ALTERNATE OPTION

(Example custom benches)

Custom Bench

Dimensions	2', 5', or 6' Lengths recommended. Must meet all setback requirements outlined in *"Element Siting & Considerations" on page 112.*
Description	Custom benches may be designed for incorporation into the ROW subject to city approval based on structural performance and aesthetic considerations.
Performance	Custom Benches must be capable of withstanding a concentrated load of 200 lbf applied at any point and in any direction; a uniform load of 50 lbf/ft applied horizontally and concurrently with uniform load of 100 lbf/ft applied vertically downward. Custom Benches shall meet or exceed the requirements of applicable local and state building codes.
Material	Custom Benches must be made of durable materials, capable of resisting corrosion in Burlington’s high-salt environment.
Finish	Custom Benches must be finished to resist rust, peeling, chipping, cracking, mold, and mildew. Warranty for 5 years from date of installation.
Installation	Mount permanent Custom Benches to streetscape pavement or a concrete base with corrosion-resistant hardware.

Movable Chair

ALTERNATE OPTION

Bistro Chair—by Fermob

Dimensions	32” H x 15”D x 16”W
Material	Galvanized & Lacquered Steels
Finish	Storm Grey Powdercoat
Installation	Freestanding
Manufacturer	Fermob
Note	*Appendix section A-8*

ALTERNATE OPTION

Verona—by Landscape Forms

Dimensions	30” H x 25”D x 20–23”W
Material	Tubular Steel Frame, Perforated Metal or Metal Grid Seat Insert
Finish	Pangard II® polyester powdercoat—RAL 9007 Gray Aluminum
Options	With or Without Armrests
Installation	Freestanding
Manufacturer	Landscape Forms
Note	*Appendix section A-8*

Note: These standards provide two options for movable chairs the City may install for use in the public ROW. These may also be utilized by property owners, restaurateurs, residents, and retailers when locating movable seating in outdoor spaces on private property or in public ROW through the encumberance process. However, these are not mandatory, and private operators may select others that better suit their purposes.

Movable Table

ALTERNATE OPTION

Bistro Table—by Fermob

Dimensions	33"DIA x 29"H
Material	Lacquered Steel
Finish	Storm Grey Powdercoat
Installation	Freestanding
Manufacturer	Fermob
Note	*Appendix section A-8*

ALTERNATE OPTION

Parc Centre Table—by Landscape Forms

Dimensions	30" DIA x 30"H
Material	Steel
Finish	Pangard II® polyester powdercoat—RAL 9007 Gray Aluminum
Installation	Freestanding
Manufacturer	Landscape Forms
Note	*Appendix section A-8*

ALTERNATE OPTION

Parc Centre Table—by Landscape Forms

Dimensions	28" L x 28" W x 30" H
Material	Steel
Finish	Pangard II® polyester powdercoat—RAL 9007 Gray Aluminum
Installation	Freestanding - Surface mounting options & leveling feet are available
Manufacturer	Landscape Forms
Note	*Appendix section A-8*

Note: These standards provide three options for movable tables the City may install for use in the public ROW. These may also be utilized by property owners, restaurateurs, residents, and retailers when locating movable seating in outdoor spaces on private property or in public ROW through the encumberance process. However, these are not mandatory, and private operators may select others that better suit their purposes.

Bike Rack

RECOMMENDED OPTION

The Arc—by Huntco

Dimensions	32" H x 28" L x 1 ½" W
Material	Stainless Steel
Finish	#4 Satin Electropolish on Stainless Steel
Installation	Can be installed in treebelt pavers, but must be embedded into a concrete base. Install per manufacturer instructions. Stainless steel mounting hardware with 2 security nuts for surface mount available.
Manufacturer	Huntco
Note	*Appendix section A-8*

	Least				Most
Aesthetics					●
Upfront Cost				●	
Durability				●	
Available				●	

RECOMMENDED OPTION

Downtown—by Dero

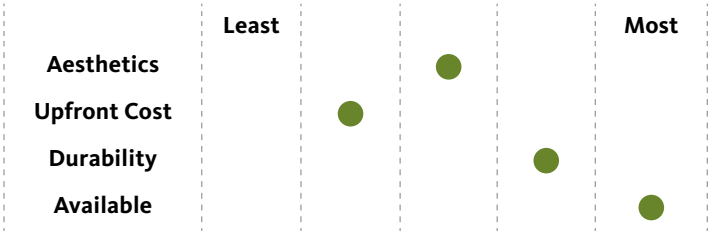
Dimensions	36" H x 30"L x 2"W
Material	Recycled Mild Steel
Finish	Hot-Dipped Galvanized Finish
Installation	Surface-mounted on a concrete base using corrosion-resistant hardware. When installing the rack in unit pavers, mount below pavement surface to concrete footing and cut pavers to fit posts. Install per manufacturer instructions.
Manufacturer	Dero
Note	*Appendix section A-8*

	Least				Most
Aesthetics		●			
Upfront Cost		●			
Durability			●		
Available					●

ALTERNATE OPTION

Bike Hitch—by Dero

Dimensions	35″ H x 16.5″ L x 2.375″ W
Material	Metal Centerbeam: 2″ schedule 40 pipe (2.375″ OD) Ring: 1.5″ OD 11 guage tube
Finish	Galvanized or Stainless Steel
Installation	Mount with manufacturer-provided hardware. Install per manufacturer instructions. Mounting: surface or embedded
Manufacturer	Dero
Note	*Appendix section A-8*



CUSTOM OPTION

(Example custom bicycle parking)

Custom Bicycle Rack

Description	Custom bike racks may be designed for incorporation into the ROW subject to city approval based on structural performance and aesthetic considerations.
Dimension	Maximum dimensions: 48″ H; 12' L Must meet all setback requirements outlined in *"Element Siting & Considerations" on page 112.*
Performance	Bicycle racks must be capable of withstanding a concentrated load of 200 lbf applied at any point and in any direction; a uniform load of 50 lbf/ft applied horizontally and concurrently with uniform load of 100 lbf/ft applied vertically downward. Custom Bicycle Racks must provide two-point support for attached bicycles and allow a standard "U" lock to attach a bicycle to the rack to discourage theft. Bicycle Racks shall meet or exceed the requirements of applicable Local and State building Codes.
Materials	Custom Bicycle Racks & mounting hardware must be made of durable materials, capable of resisting corrosion in Burlington's high-salt environment.
Finish	Custom Bicycle Racks must be finished to resist rust, peeling, chipping, cracking, mold, and mildew. Warranty for 5 years from date of installation.
Mounting	Mount permanent Custom Bicycle Racks to streetscape pavement or a concrete base with corrosion-resistant hardware.

High-Capacity Bike Parking

RECOMMENDED OPTION

Anchor plate detail

U-Lockit Bike Rack—by Dero

Dimensions	20' L x 8' W
Material	Recycled Mild Steel
Finish	Hot-Dipped Galvanized Finish
Capacity	6+ bicycles Each arm accomodates 2 bicycles. Minimum assembly recommended for stability is 3 bike arms, with required anchor mounting plates. (Image above shows assembly with 4 bike arms)
Note	For permanent or temporary use. May be used in single parking stall as a Bike Corral; see *"Bike Corrals" on page 134* for design and layout guidelines. *Appendix section A-8*

	Least				Most
Aesthetics	●				
Upfront Cost		●			
Durability			●		
Available					●

ALTERNATE OPTION

Cycle Stall Elite—by Dero

Dimensions	40" H x 216"L x 63"W
Material	Recycled Mild Steel
Capacity	14 Bicycles
Finish	Hot-Dipped Galvanized Finish
Permitting	Bicycle Corrals require permits before they are installed in the ROW. The permitting process is outlined in Burlington's 2015 Community-Led Demonstration Project Policy and Guide.
Installation	Mount directly to concrete or asphalt pavement. Install per manufacturer instructions. Install manufacturer-provided traffic delineators and reflectors as included by manufacturer per MUTCD standards.
Manufacturer	Dero
Note	Shall not be used in single parking stall corral configuration due to required buffers from adjacent parking spaces. May be used in double parking stall configuration, either alone or in conjunction with a 12-foot parklet layout. Must maintain required 4' minimum setback from adjacent parking stalls. For use in a Bike Corral; see *"Bike Corrals" on page 134* for design and layout guidelines.

	Least				Most
Aesthetics			●		
Upfront Cost				●	
Durability				●	
Available					●

Bike Shelter

RECOMMENDED OPTION

Parachute—by Duo-Gard

Dimensions	8' H x 13' L x 8'-6" W
Material	Steel frame Translucent polycarbonate roof panels
Capacity	8 bikes
Finish	Galvanized, or Duo-Gard Paint Process to match RAL 9007 Gray Aluminum
Installation	Mount with manufacturer-provided hardware. Install per manufacturer instructions. Mounting: surface or embedded
Manufacturer	Duo-Gard
Note	*Appendix section A-8*

Bicycle Repair Station

RECOMMENDED OPTION

Fixit—by Dero

Dimensions	59” H x 20”L x 13”W
Material	Recycled Steel
Finish	Raw, Hot-Dipped Galvanized Finish
Tools Included	Manual air pump Philips and flat head screwdrivers 2.5, 3, 4, 5, 6, 8mm Allen wrenches Headset wrench Pedal wrench 8, 9, 10, 11mm box wrenches
Installation	Surface Mount to Concrete Base using 10” diameter x .25” foot with four anchors per foot. Install per manufacturer instructions.
Manufacturer	Dero
Note	*Appendix section A-8*

	Least				Most
Aesthetics			●		
Upfront Cost			●		
Durability					●
Available					●

Parklet Elements

RECOMMENDED OPTION

Parklet—by Dero

Dimensions	168”L x 72”W Additional decking available in 8-foot units
Material	Recycled Mild Steel
Finish	Hot-Dipped Galvanized Finish
Permitting	Parklets require permits before they are installed in the ROW, which is outlined in Burlington’s 2015 Community-Led Demonstration Project Policy and Guide.
Installation	Freestanding. Install per manufacturer instructions with Dero railing and cables. Install with safe-hit posts and tire stops.
Manufacturer	Dero
Note	Shall not be used in single parking stall parklet configuration due to required buffer from adjacent parking stalls. May be used in double parking stall configuration, either alone or in conjunction with bike corral. Must maintain required 4' minimum setback from adjacent parking stalls, and 1.5' minimum setback from travel lane. See *"Parklet Guidelines & Setbacks" on page 128* for design and layout guidelines.

	Least				Most
Aesthetics				●	
Upfront Cost					●
Durability					●
Available				●	

REQUIRED

Safe-Hit Type 2 Guide Post

Dimensions	36″ height
Color	White post Silver reflective
Installation	Surface Mount Pin Lock Base (anchor not epoxy)
Notes	Must be used in both off-the-shelf and custom designed bike corral/parklet. See *"Parklet Guidelines & Setbacks" on page 128* for design and layout guidelines.

REQUIRED

Wheel Stops

Dimensions	6″ H x 36″ L
Material	Concrete
Installation	Mounted with bolts
Notes	Must be used in both off-the-shelf and custom designed bike corral/parklet. See *"Parklet Guidelines & Setbacks" on page 128* for design and layout guidelines.

Bollard

RECOMMENDED OPTION

Isac—by mmcité

Dimensions	34 ⅞” H; Ø 4 ¾”
Material	Cast Aluminum
Finish	RAL 9007 Gray Aluminum Powdercoat
Installation	Install with concrete base per manufacturer specifications. Removable & Fixed Options Available.
MUTCD	Install & modify with retroreflective tape as required by MUTCD in relevant locations.
Manufacturer	mmcité
Note	This bollard should be used whre vehicles are not backing up. They may not be visible to a driver who is reversing. Not suitable for in-street use to separate a bike lane from vehicular traffic. *Appendix section A-8*

ALTERNATE OPTION

DG-4—by Urban Accessories

Dimensions	44”H - Ø 7 3⁄16”
Material	Recycled Aluminum, Bronze Cap
Finish	Hot Dip Galvanized with RAL 9007 Gray Aluminum Powdercoat. Decorative cast silicon-bronze cap.
Installation	Install with concrete base per manufacturer specifications. Options: surface-mounted; cast-in; removable/lockable
MUTCD	Install & modify with retroreflective tape as required by MUTCD in relevant locations.
Manufacturer	Urban Accessories
Note	This bollard is more appropriate where vehicles may back into, or in the direction of, the bollard. Not suitable for in-street use to separate a bike lane from vehicular traffic. *Appendix section A-8*

	Least				Most
Functionality			●		
Sustainability			●		
Appropriate				●	

	Least				Most
Functionality				●	
Sustainability				●	
Appropriate			●		

Planters

RECOMMENDED OPTION

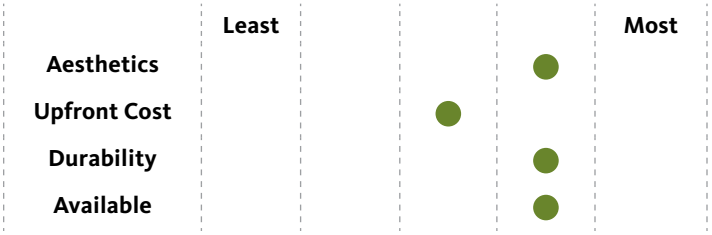
Sorella—by Landscape Forms

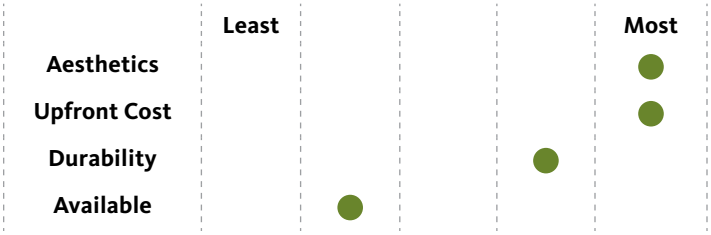
Shape	Shape: Squares & Rectangles
Sizes	12 Sizes available: 18" and 30"Heights (13-137 Gallons)
Material	Stainless Steel
Drainage	Specify drain holes for all outdoor planters
Finish	Satin Finish Pangard II Polyester Powdercoat
Colors	RAL 9007 Gray Aluminum; Grass, Steel, Mercury, Matte Black
Installation	Freestanding. Optional: Surface Mounted with Anchoring Hardware per Manufacturer Specifications. Sorella planters are not appropriate for In-Street Installation.
Manufacturer	Landscape Forms
Note	*Appendix section A-8*

ALTERNATE OPTION

Larkspur—by Landscape Forms

Sizes	3 Sizes Available: 24" H x 36" x 36" 30" H x 48" x 48" 48" H x 32" x 32"
Material	Cast Concrete 5,000–6,000 psi
Colors	Cobblestone, Graphite, Green Slate, Outback, Pebble, Pewter, Willow Green
Installation	Freestanding. Larkspur planters are not appropriate for In-Street Installation.
Manufacturer	Landscape Forms (Kornegay Design)
Note	Specify planters with manufacturer-provided concrete additives included to enhance the concrete's durability in cold weather conditions. *Appendix section A-8*





Planters

ALTERNATE OPTION

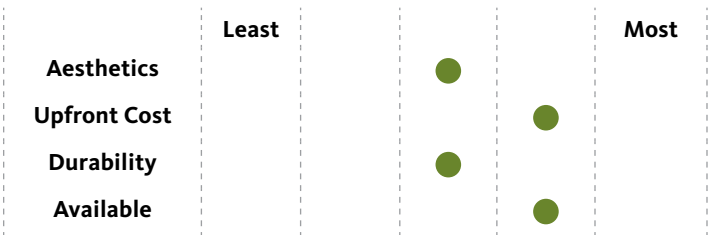
Downtown Self-Watering—by Tournesol

Shape	Round, Square, Rectangle, Bowl
Sizes	20 Sizes Available: 18″–42″ heights (2–93 cu. ft.)
Material	Fiberglass or Glass Fiber Reinforced Concrete (GFRC)
Drainage	Specify drain holes for all outdoor planters
Colors	Fiberglass Colors: Pitch, Puddle, Reed, Royalty, Shadow, Shark, Smoke GFRC Finish & Colors: Sandblast Finish—Colonial, Shadow, Shark
Installation	Freestanding. Include manufacturer's self-watering container irrigation system
In-Street Installation	Install with traffic delineators and reflectors as required per MUTCD standards
Manufacturer	Tournesol Siteworks
Note	*Appendix section A-8*

CUSTOM OPTION

Custom Planter

Shape	Round, Square, Rectangle, Bowl
Sizes	18″–42″ H; 12″–48″ W
Material	Metal, concrete, fiberglass, wood
Drainage	Specify drain holes for all outdoor planters
Colors	To be approved by City
Installation	Freestanding. Include self watering container irrigation system
In-Street Installation	Install with traffic delineators and reflectors as required per MUTCD standards
Manufacturer	Custom
Notes	For use in buffer of a protected bike lane, or as other custom designed element.



Trash/Recycling

RECOMMENDED OPTION

Bigbelly & Smartbelly double station

Dimensions	50”H x 27”D x 51”L
Material	Galvanized Steel & Heavy Duty Plastic
Finish	Manufacturer Standard
Installation	Surface Mounted per Manufacturer Specifications
Sensor	At city request, utilize Connect™ smart waste and recycling system by Bigbelly to monitor and communicate system fill level, performance, and maintenance.
Manufacturer	Bigbelly Solar, Inc.
Note	*Appendix section A-8*

RECOMMENDED OPTION

Steelsites SDC-36—by Victor Stanley

Dimensions	24-½” DIA x 43-⅞” H
Material	Recycled Steel & Heavy Duty Plastic Insert
Finish	Hot Dip Galvanized with RAL 9007 Gray Aluminum Powdercoat
Installation	Install in pairs (1 Trash, 1 Recycle). Surface Mounted per Manufacturer Specifications.
Capacity	36 gallons
Security	Do not lock
Sensor	At city request, install Victor Stanley Relay™ system to monitor and communicate each receptacle’s fill level, weight, location, system temperature, and collection status.
Manufacturer	Victor Stanley
Note	*Appendix section A-8*

	Least				Most
Aesthetics		●			
Upfront Cost					●
Durability				●	
Available					●

	Least				Most
Aesthetics					●
Upfront Cost				●	
Durability				●	
Available				●	

Trash/Recycling

CUSTOM OPTION

Custom Trash Receptacle

Dimensions	44″ H x 24″ W; square or round (per individual receptacle)
Material	Metal, wood, concrete
Finish	To be approved by City
Installation	Install in pairs (1 Trash, 1 Recycle). Surface Mounted.
Manufacturer	Custom
Performance	Must have a top, shall not be locked, must be installed in pairs, and should include sensor to monitor fill level.

Newsrack

RECOMMENDED OPTION

City Line News Paper Stand—by Lucid Management Group

Dimensions	48″ H x 72″ L x 24″ D
Material	Metal
Finish	RAL 9007 Gray Aluminum Powdercoat
Installation	Mount with manufacturer-provided hardware. Install per manufacturer instructions. Mounting: embedded
Manufacturer	Lucid Management Group
Model	SF-003-002
Performance	Accommodates a range of different publication boxes, including coin pay inserts and/or free publication inserts. Modular design allows for various insert types and sizes as well as easy installation.

Public Toilets

Conveniently located restrooms are welcomed by both residents and tourists and take the pressure off business owners from having to provide sanitary facilities for the general public. Where provided, public restrooms and portable toilet facilities on a site or in the public right-of-way should be accessible.

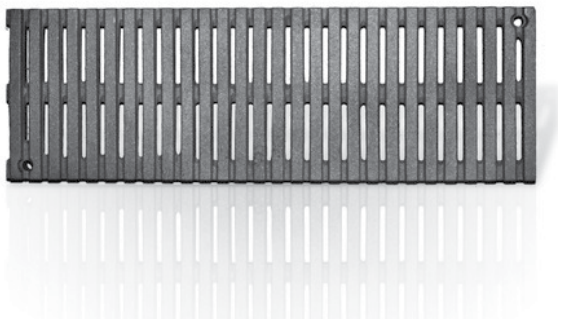
RECOMMENDED OPTION

Portland Loo

Dimensions	10'–7½" L x 6'–4" W x 8'–9⅛" H
Material	SAE 304 stainless steel Carbon steel posts
Foundation	10'–11½" L x 6'–8" W x 1'–6" D
Installation	Per manufacturer specifications
Manufacturer	Portland Loo
Reference	Portland Loo Structural/Architectural Drawings in *Appendix section A-8*
Note	While the Portland Loo model is recommended initially, the City may wish to pursue a custom option. Additionally, exterior sides may be considered for potential art and/or information displays.

Trench Grate

RECOMMENDED OPTION

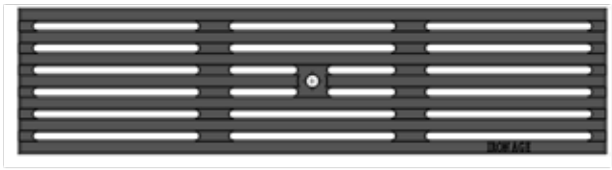


Jamison—by Urban Accessories

Dimensions	9 Sizes Available: 2"–24" width Slot Opening Size: .25"
Material	Ductile Iron
Finish	Raw Natural Finish
Installation	Install per manufacturer specifications to support H-20 Loading. http://www.urbanaccessories.com/product-categories/installation-frames
Manufacturer	Urban Accessories
Similar	"Regular Joe" Heelproof Trench Drain Grate
Note	*Appendix section A-8*

	Least				Most
Functional					●
Upfront Cost				●	
Maintenance		●			
Available				●	

ALTERNATE OPTION



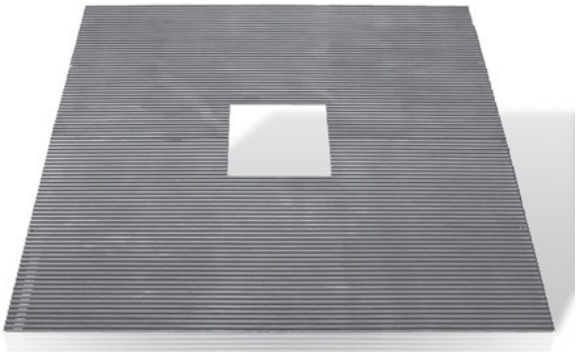
Que Heel Proof—by Iron Age Designs

Dimensions	8 Sizes Available: 2"–12" width Slot Opening Size: .25"
Material	Cast Ductile Iron
Finish	Raw Natural Finish
Installation	Install per manufacturer specifications to support H-20 Loading.
Manufacturer	Iron Age Designs
Reference	Manufacturer website: https://www.ironagegrates.com/product/que/

	Least				Most
Functional				●	
Upfront Cost			●		
Maintenance		●			
Available				●	

Tree Grate

RECOMMENDED OPTION

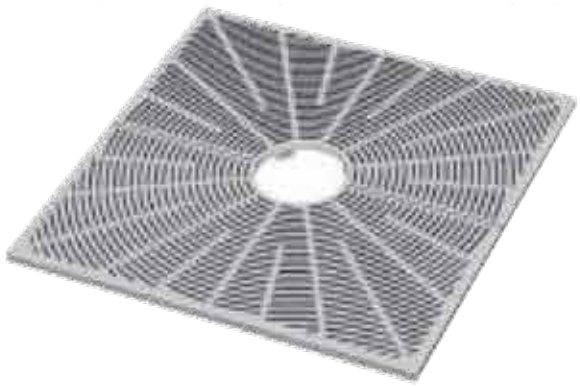


Jamison—by Urban Accessories

Size	6' x 12'; 8' x 16' (Match full Treebelt width)
Tree Opening	17″ x 17″ square
Slot Opening	.25″
Material	Ductile Iron
Finish	Raw natural finish
Installation	Install to meet H-20 loading requirements in frame per manufacturer-provided specs http://www.urbanaccessories.com/product-categories/installation-frames
Manufacturer	Urban Accessories
Paired with	Any Street Tree Guard
Note	8' x 16' option custom order Detail drawings in *Appendix section A-8* For center opening expansion instructions, see details in *Appendix section A-8*

	Least				Most
Functional					●
Upfront Cost				●	
Maintenance			●		
Available			●		

ALTERNATE OPTION



Boulevard—by Neenah

Size	6' x 6'; 8' x 8' (Match full Treebelt width)
Tree Opening	Ø 16″
Slot Opening	.375″
Material	Cast iron
Finish	Raw natural finish
Installation	Install to meet H-20 loading requirements in frame per manufacturer-provided specs
Manufacturer	Neenah
Paired with	S-6 Tree Guard
Note	Tree grate allows for easy expansion of diameter of opening for tree as tree grows.

	Least				Most
Functional				●	
Upfront Cost		●			
Maintenance			●		
Available				●	

Tree Guard

RECOMMENDED OPTION

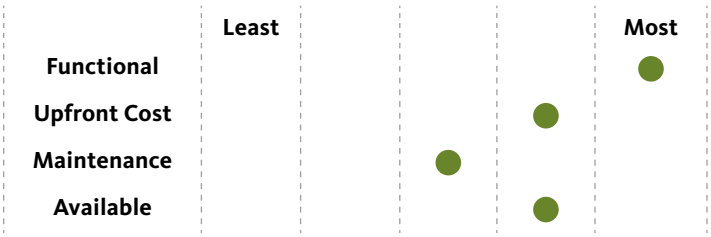
Any Street—by Urban Accessories

Dimensions	Height: 60” Opening: 15 5/8” x 15 5/8”
Material	Mild Carbon Steel
Finish	Hot Dip Galvanized with RAL 9007 Gray Aluminum Powdercoat
Installation	Mount to Jamison Tree Grate per Manufacturer specifications with corrosion-resistant hardware.
Manufacturer	Urban Accessories
Paired With	Jamison Tree Grate
Note	Install without removable Street Number Panel *Appendix section A-8*

ALTERNATE OPTION

S-6—by Victor Stanley

Dimensions	Height: 48” Opening: Ø 15
Material	Recycled Solid Steel Bar
Finish	Hot Dip Galvanized with RAL 9007 Gray Aluminum Powdercoat
Installation	Mount to Boulevard Tree Grate per Manufacturer specifications with corrosion-resistant hardware.
Manufacturer	Victor Stanley
Paired With	Boulevard Tree Grate
Note	To be phased out



Soil Cells

RECOMMENDED OPTION

Silva Cell 2—by deeproot

Dimensions	24" W x 48" L Multiple Heights Available
Installation	Install to meet AASHTO H-20 loading requirements per Manufacturer-provided specifications. Seek manufacturer-assistance in individual project design & engineering.
Manufacturer	deeproot

RECOMMENDED OPTION

StrataVault 60 Series—by GreenBlue Urban

Dimensions	24" W x 24" L x 16" H
Installation	Install to meet AASHTO H-20 loading requirements per Manufacturer-provided specifications. Seek manufacturer-assistance in individual project design & engineering.
Manufacturer	GreenBlue Urban

ALTERNATE OPTION

StrataCell 60 Series—by GreenBlue Urban

Dimensions	20" W x 20" L x 10" H
Installation	Install to meet AASHTO H-20 loading requirements per Manufacturer-provided specifications. Seek manufacturer-assistance in individual project design & engineering.
Manufacturer	GreenBlue Urban

Bus Shelter

RECOMMENDED OPTION

Bus Shelter—by enseicom

Dimensions	149½" L x 84" W x 102¼" H 128" front opening
Material	Aluminum, tempered glass
Installation	Install per manufacturer's instructions
Manufacturer	enseicom
Reference	*Appendix section A-8* For elements to include in a Transit stop or shelter see *"Transit Shelters & Stops" on page 116*
Note	Tinting, etching, symbols, etc to make glass less transparent/increase visibility is encouraged. Custom bus stops and bus stop elements may be designed in consultation with the City and GMT.

Parking Meters

RECOMMENDED OPTION

Paystation Model CMTCCC Solar—by Cale

Multi Space Meter Installation

- See details for placement of pay station in *"Parking Meters & Kiosk" on page 114*
- Typically a concrete foundation for a pay station measures 2' × 2' × 2' which translates to @.29 yards of concrete X 4,000 # per yard would be 1,160 pounds of concrete. Spec was set up for anti theft.
- Also good in sandy soil around beach areas.
- Some have been installed at 18" deep which is @ 800 # of concrete which is probably more than enough in rock and clay.

Reference

Appendix section A-8

ALTERNATE OPTION

[Smart Meter] - Manufacturer

Meter Pole Installation

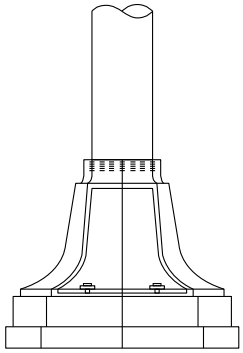
- Prefer to locate double meter head on a pole to serve two adjacent parking spaces.
- Meter pole in concrete sidewalk: core drill 4' diameter hole; set post 8" deep in non shrink construction grout.
- Meter pole in dirt: dig or auger post hole 18" deep and set in concrete, usually 80# per hole. Some sandy areas near the beach may require posts set 2' deep with plenty of concrete.
- Post height can vary from city to city. Normally 37" above grade. Handicap posts 28" to allow for 48" ADA visibility.
- Single post location usually 2' off curb and 3' back from head of space.
- May set closer to curb depending on 48' wide ADA clearance

Reference

Appendix section A-8

Traffic Control Signals

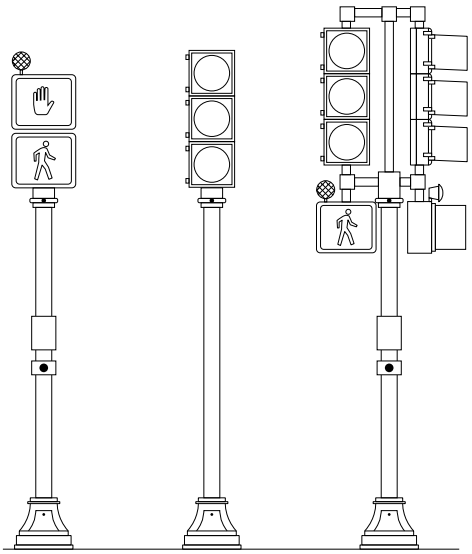
PEDESTAL POST AND BASE



Description:	Octagonal base
Dimensions:	Base: 16″–18″ W typ.; 14″ H typ. Post: 4½″ diameter Hand hole: 60 sq. in. (min.)
Color:	Black
Footing Detail:	See "Details of Reinforced Concrete Footing for Pedestal Post" in ref. dwg. **VTrans Standard E-170** in *Appendix section A-4*
Reference:	See ref. dwg. **VTrans Standard E-170 Traffic Control Signals Pedestal Post Mounted** in *Appendix section A-4*

Note: These standards provide details for traffic control elements for which the City may indicate preference; it is not inclusive of all traffic control devices which may be placed within the downtown public rights of way. This document is not intended to replace the MUTCD. A traffic control device not included in this document should not be assumed to be procluded from use within the downtown if the appropriate traffic characteristics warrant its use. Professionals should consult the appropriate MUTCD standards that apply to any proposed traffic control devices, including but not limited to those which are referenced herein.

PEDESTAL POLE



Description:	Left: Pedestrian signal Center: Vehicle signal Right: Vehicle and Pedestrian signals
Setback:	2' min. from face of curb (see ref. dwg. **VTrans Standard E-171A** in *Appendix section A-4*)
Audio Signal:	8' min. mounting height
Pedestrian Push Button:	When a pedestrian push button is used, include auditory features that announce "Wait" when button is engaged, and which verbally indicates which leg of an intersection may be crossed. Follow all applicable MUTCD standards for the mounting location, accessibility and signage. 3'-6″ mounting height from sidewalk surface. See ref. dwg. **VTrans Standard E-170 Traffic Control Signals Pedestal Post Mounted** in *Appendix section 313* Accessibility Detail: **VTrans ref. dwg. Standard E-171C** in *Appendix section A-4*
Color:	Black
Note	Must be able to accomodate street light mounted to top of pole As Great Streets Standards are implemented and pedestrian crossing distances become shorter, some downtown signals may transition to include an automatic pedestrian phase. Some signals may be accompanied by lights, signals and/or signage that provide additional visibility and protection for pedestrians. When these devices are used, they must conform to applicable MUTCD standards.

Signage

INFORMATION & DIRECTIONAL SIGNAGE

Pedestrian-oriented signs have been developed for downtown to assist visitors and residents. Examples of key destinations to include in signage and/or to locate signage are libraries, post offices, government offices, transit centers, schools, museums, entertainment centers, shopping districts, parks, public rest rooms, and tourist attractions.

Because pedestrians and bicyclists expend their own energy getting to a destination, it is important to maximize wayfinding opportunities to reduce the possibility of out of direction travel. In addition, destinations that are familiar to a resident may be unknown to a visitor. Frequently spaced information kiosks and directional signs can alleviate these problems and make the environment more inviting to walking and bicycling. Where provided, locate information kiosks and directional signs adjacent to but outside the Pedestrian Through Zone.

Place only enough signs to lead a pedestrian confidently to the destination by the best route. Avoid adding clutter to the streetscape by clustering signs in strategic locations on a single post where possible.

Additional Resources

VTrans Standard E-121 Standard Sign Placement Conventional Road in *Appendix section A-9*

VTrans Standard E-125 Travel Information Council Signs in *Appendix section A-9*

VTrans Standard E-161 W-Shaped Steel Sign Post in *Appendix section A-9*

VTrans Standard E-162 Tubular Aluminum Sign Post in *Appendix section A-9*

VTrans Standard E-163 Tubular Steel Sign Post in *Appendix section A-9*

VTrans Standard T-56 Standard Sign Placement in *Appendix section A-9*

Lake Champlain Wayside Exhibit Manual in *Appendix section A-9*

Vermont Roadside Historic Site Markers in *Appendix section A-9*

Wayfinding

Hairpin Directional Signs

Dimensions	12' H x 3'-1" W x 3" D
Material	3" curved aluminum pipe .10" aluminum panels
Reference	See **Burlington Wayfinding Improvements Plans—STP5000(17)** in *Appendix section A-9*

Small Directional Signs (Parking)

Dimensions	Total post height and clearance based on panels/ messages. Min. 5'-0"; min. clearance 7'-0" where pedestrian and/or turning movements occur below sign Panel width: 1'-6"
Material	2" square 14 gauge pre-drilled "off-the-shelf" aluminum post. .10" aluminum panel
Reference	See **Burlington Wayfinding Improvements Plans—STP5000(17)** in *Appendix section A-9*

Pedestrian Wayfinding

Dimensions	Total post height varies. Typical clearance 8'-0". Panels: 6" H x 1'-9" (1'-7½" visible) W
Material	4" circular aluminum post ¼" aluminum panel
Reference	See **Burlington Wayfinding Improvements Plans—STP5000(17)** in *Appendix section A-9*

Public & Event Information

Map & Public Information Kiosk (PILOT)

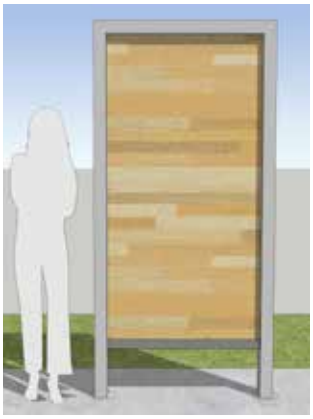
The City is developing a pilot prototype for a map kiosk intended to display information beneficial to those who are walking, biking, and using public transit. The information is likely to include a map with information about walking distances, key destinations, bike facilities, and transit facilities and operations. The kiosk design should be of the highest quality and in coordination with the overall city-wide wayfinding program. Once developed and approved, the kiosk design will become part of the Downtown Street Design Standards.

Dimensions	Approx. 7' high x 1.5' wide x 10" deep Kiosk may have one or two faces, depending on the final design and location
Material	Frame should be aluminum or stainless steel with tempered glass or some other material insert to display content.
Installation	Unit shall be bolted to the sidewalk or concrete pad.
Location	Map and wayfinding information most useful near intersections. See *"Kiosks (Map, Information & Bulletin Board)" on page 113* for more information regarding placement within the public right-of-way
Notes	The City may consider whether internally illuminated wayfinding information could be incorporated as part of these kiosks.

Curated Event & Information Kiosk (PILOT)

The City is developing a pilot prototype for a curated information and event kiosk intended to display small or large posters for cultural events and other purposes. Once developed and approved, the kiosk design will become part of the Downtown Street Design Standards, and will installed at designated locations in downtown Burlington.

Dimensions	Approx 7' high x 3' wide x 1' deep A small overhang as part of the topmost part of the kiosk may be considered to help protect content from the elements. Kiosks may have one or two faces depending on the final design and location
Materials	Frame should be aluminum or stainless steel with tempered glass or some other material for affixing information.
Installation	Unit shall be bolted to the sidewalk or concrete pad.
Location	See *"Kiosks (Map, Information & Bulletin Board)" on page 113* for more information regarding placement within the public right-of-way
Notes	The City may consider whether a backlit or front lit kiosk is appropriate for increasing visibility at night.



Public Bulletin Board (PILOT)

The City is developing a pilot prototype for a public bulletin board intended to display small posters and advertisements for cultural events in the community. This bulletin board is intended to be designed using similar materials and design aesthetic as the Kioks, but utilize materials that are more accessible for public use. Once developed and approved, the bulletin board design will become part of the Downtown Street Design Standards, and will installed at designated locations in downtown Burlington.

Dimensions	Approx 7' H x 3' W x 4" D A small overhang as part of the topmost part of the bulletin board may be considered to help protect content from the elements. Kiosks may have one or two faces depending on the final design and location.
Materials	Frame should be aluminum or stainless steel with plywood or some other material for affixing information via stapling.
Installation	**Unit shall be bolted to the sidewalk or concrete pad.**
Location	See *"Kiosks (Map, Information & Bulletin Board)" on page 113* for more information regarding placement within the public right-of-way


Waterfront
.50 mi
Campus District
.58 mi
Restrooms
Toilettes
In City Hall
Bus Station